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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/090,747      | 03/06/2002  | Minoru Onodera       | 220362US0           | 5245             |

22850 7590 02/11/2004

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| EXAMINER |
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GOFF II, JOHN L

|          |              |
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| ART UNIT | PAPER NUMBER |
|----------|--------------|

1733

DATE MAILED: 02/11/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

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|------------------------------|--------------------------------------|---------------------------------------|--|
| <b>Office Action Summary</b> | <b>Application N .</b><br>10/090,747 | <b>Applicant(s)</b><br>ONODERA ET AL. |  |
|                              | <b>Examiner</b><br>John L. Goff      | <b>Art Unit</b><br>1733               |  |

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1) ☒ Responsive to communication(s) filed on 06 March 2002.

2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4) ☒ Claim(s) 1-6 is/are pending in the application.

4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.

6) ☒ Claim(s) 1-6 is/are rejected.

7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.

8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on 06 March 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☒ All    b) ☐ Some \*    c) ☐ None of:

1. ☒ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.

3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

|  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>3/02 6/03 11/03</u> . | 6) <input type="checkbox"/> Other: _____  |

U.S. Patent and Trademark Office  
PTOL-326 (Rev. 1-04)

**Office Action Summary**

Part of Paper No./Mail Date 02022004

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).
3. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Salto et al. (507332) in view of Onodera et al. (U.S. Patent 5,843,562).

Salto et al. disclose a continuous method for forming a flexible printed circuit board (FPC) by laminating at least one metal foil to at least one liquid crystal polymer (LCP) film, i.e. a thermoplastic polymer capable of forming an optically anisotropic melt phase. Salto et al. teach continuously forming the FPCs by pressing the metal foil to the LCP film using heated nip press rolls, i.e. bonding by continuous thermal press-bonding (Page 2, lines 1-2 and Page 3, lines 4-8). Salto et al. are silent as to using an LCP film having a roughened surface. However, it

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would have been obvious to one of ordinary skill in the art at the time the invention was made to use as the LCP film taught by Salto et al. one that has a roughened surface as the roughened surface provides the LCP film with good surface abrasion resistance (i.e. will not generate fluffs upon abrasion) as shown by Onodera et al.

Onodera et al. disclose an LCP film used in forming FPCs. Onodera et al. teach the LCP film has a roughened surface to provide the LCP film with good surface abrasion resistance (i.e. will not generate fluffs upon abrasion). Onodera et al. teach the LCP film is provided with a roughened surface by passing the film over a heated embossing roll (or through heated embossing rolls). However, any embossing means having the necessary projections may be used. Onodera et al. teach the projections of the roll have an average height of 1 to 10 microns (Column 1, lines 19-23 and Column 2, lines 57-60 and Column 3, lines 54-67 and Column 4, lines 1-5, 16-19, and 31-35 and Column 8, lines 28-32).

Regarding claim 2, Salto et al. and Onodera et al. are silent as to the thermal dimensional change at 200 °C of the LCP film. However, the LCP films suggested by Salto et al. and Onodera et al. (See page 3, line 30 through page 7, line 16 of Salto et al. and column 5, line 38 through column 8, lines 5 of Onodera et al.) are the same as those disclosed by applicant (See page 8, line 8 through page 12, line 3 of the specification) such that the LCP films suggested by Salto et al. and Onodera et al. would have the claimed thermal dimensional change at 200 °C.

Regarding claim 4, Onodera et al. teach passing the LCP film over a (single) heated embossing roll (Column 4, lines 32-35). It is noted in a (single) heated embossing roll there is no external application of pressure (as exemplified by Figure 2 and Column 5, lines 22-59 of Shigemoto et al. (U.S. Patent 4,880,589)).

Regarding claim 6, Onodera et al. teach the heated embossing roll operates at a temperature that will cause the embossing pattern to be transferred to the film. Onodera et al. are silent as to operating the embossing roll at the thermal deflection temperature of the LCP film. However, Onodera et al. show results where temperatures from 200-250 °C for LCP films comprising p-hydroxybenzoic acid and 6-hydroxy-2-napthoic acid is sufficient to transfer the embossed pattern to the films such that the films have an abrasion resistance index from at least 1-5 (See example 2, comparative example 2, and table 1). It is noted the examples shown by applicant (See in particular reference example 1) use LCP films of the same materials wherein these films have thermal deflection temperatures of 200 °C and thus, because Onodera et al. teach operating the embossing roll at 200 °C the claimed limitations are disclosed. In any event, it is noted Onodera et al. show the abrasion resistance is a function of not only the temperature of the embossing roll but the particular embossed pattern (See table 1) such that it would have been obvious to one of ordinary skill in the art at the time the invention was made to determine/optimize the particulars of the embossing roll, e.g. temperature, pattern, etc., as a function of the abrasion resistance of the final product as doing so would have required nothing more than ordinary skill and routine experimentation.

### ***Conclusion***

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **John L. Goff** whose telephone number is **(571) 272-1216**. The examiner can normally be reached on M-F (7:15 AM - 3:45 PM).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino can be reached on (571) 272-1226. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



John L. Goff



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